1706

PROJECT SPECIFIC PLAN FOR THE CERTIFICATION OF AREA 1 PHASE I SEDIMENT TRAPS 2 & 3

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

AUGUST 1998

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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REVISION 1

1706

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August 1998

Prepared For:

U.S. Department of Energy
Fernald Area Office

APPROVAL:

8/11/98

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8/11/98

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ACRONYMS AND ABBREVIATIONS

A1PI	Area 1, Phase I
A1PII	Area 1, Phase II
ASL	Analytical Support Level
BM	Berm
BB	Beneath Berm
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CU	Certification Unit
DQO	Data Quality Objective
FACTS	Fernald Analytical Customer Tracking System
FAL	Field Activities Log
FDF	Fluor Daniel Fernald
FRL	Final Remediation Level
GIS	Graphical Information System
IRDP	Integrated Remedial Design Package
ppm	parts per million
PSP	Project Specific Plan
PWID	Project Waste Identification Document
QA/QC	Quality Assurance/Quality Control
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SB	Sediment Basin
SCEP	Soils Characterization and Excavation Project
SCL	Sample Collection Log
SCQ	Sitewide CERCLA Quality Assurance Project Plan
ST	Sediment Traps
SMMP	Soil and Miscellaneous Media Projects
V/FCN	Variance/Field Change Notice
WAC	Waste Acceptance Criteria
WDSS	Waste Disposition Support Services

1.0 INTRODUCTION

1.1 PURPOSE

This Project Specific Plan (PSP) describes the sampling and analysis activities necessary to certify the Area 1, Phase I (A1PI) Sediment Traps 2 and 3, located in A1PI in the northeastern portion of the Fernald Environmental Management Project (FEMP) as shown in Figure 1.

1.2 SCOPE

The scope of this PSP is limited to collection of the certification samples for A1PI Sediment Traps 2 and 3 as described in the Certification Design Letter (CDL). This work will be performed in accordance with Data Quality Objective (DQO) SL-043. An uncontrolled copy of this DQO is included in Appendix A.

1.3 KEY PROJECT PERSONNEL

The key project personnel include team members of the Soil Characterization and Excavation Project (SCEP), Soil and Miscellaneous Media Projects (SMMP), and DOE (Table 1-1).

Table 1-1
Key Project Personnel

Title	Name	Alternative
DOE Contact	Rob Janke	Kathy Nickel
Area 1, Phase II Project Manager	Tony Klimek	Alex Duarte
Area 1, Phase II Characterization Lead	Alex Duarte	Dave Russell
Field Sampling Manager	Mike Frank	Tom Buhrlage
Data Management Lead	Alex Duarte	Bill Westerman
Real-Time Monitoring Contact	Joan White	Dale Seiller
Laboratory Contact	Bill Westerman	Alex Duarte
Waste Disposition Contact	Christa Walls	Sue Lorenz
Health and Safety	Debbie Grant	Dan Stempfley
Quality Assurance Contact	Reinhard Friske	Mary Eleton

2.0 CERTIFICATION DESIGN, SAMPLING, AND ANALYSIS

2.1 CERTIFICATION DESIGN

The certification design follows the general approach outlined in Section 3.4 of the SEP. As shown in Figure 2, the areas to be certified consist of three certification units (CUs) per sediment trap:

- In each trap, the sediment basin area will be a CU labeled A1PI-ST2-SB and A1PI-ST3-SB, respectively.
- In each trap, the berms will be one CU labeled A1PI-ST2-BM and A1PI-ST3-BM, respectively.
- In each trap, the soil beneath the berms will be a CU labeled A1PI-ST2-BB and A1PI-ST3-BB, respectively.

Figure 2 shows the design for all the CUs within the scope of this PSP. See CDL for further information regarding CU design.

2.2 SAMPLING LOCATIONS

The areas requiring certification for both A1PI-ST-2 and A1PI-ST-3 include the sediment trap areas, the berms, and the soil beneath the berms. Therefore, three CUs will be established within each sediment trap: one to cover the sediment trap area, one to cover the berm, and one to cover the soil beneath the berm (established directly beneath the CU that covers the berm).

Since the berm CUs are established directly over the CUs representing the area beneath the berms, one set of sample locations has been established for both CUs. During sample collection, the berm certification samples will be taken at the 0 to 6-inch interval, while the certification samples for the CUs below the berms will be collected from the top 0 to 6 inches of native soil beneath the berms. The depth of the native soil will be confirmed by a field geologist and by historical (pre-excavation) elevation data. This sampling will be conducted using the Geoprobe method. The sample locations for all the CUs within the scope of this CDL are also shown in Figure 2, and were selected per Section 3.4.2.1 of the SEP. Prior to sampling, the surveyed sample locations will be walked over to ensure the samples are representative and can be taken safely.

Note: Sample 7 in the sediment basin of A1PI-ST-2 has been relocated approximately four feet to the south, since the original location fell on the check dam for the sediment trap.

Per the SEP, 16 discrete soil samples will be collected from random locations as discussed above. Each sample will be collected from the 0 to 6-inch soil interval at the designated and surveyed sample point. Samples 1, 2, 3, 5, 6, 7, 9, 10, 11, 13, 14, 15, and those shown on Figure 3 in each CU will be submitted for analysis for the appropriate ASCOCs, while the remaining four (4, 8, 12, 16) will be archived.

Sample identifiers for each sample are listed in Appendix B and Fernald Analytical Computerized Tracking System (FACTS) identification numbers will be assigned to each sample. Each sample has been assigned a unique sample identification number as follows:

A1PI - Certification Area - Certification Unit - Sample Location - Suite - QC

where:

A1PI = Area 1, Phase II
Certification Area = ST2 - Sediment Trap 2, and ST3 - Sediment Trap 3
Certification Unit = SB - Sediment Basin, BM - Berm, BB - Beneath Berm
Sample Location = location number within the CU
Suite = Analytical Suite. "R" = Radionuclides, "M" = Metals, "MV"= Metals Archive, "RV" = Radiological Archive
QC = Quality control sample. A "D" indicates a duplicate sample, where applicable. "B" (e.g., A1PII-ST-X-R) will be used to indicate a rinsate or container blank sample, as assigned by EM personnel.

2.3 SURVEYING

The NAD83 State Planar coordinates have been determined for each sample location, as shown in Appendix B. Prior to sample collection, CU boundaries will be marked in the field. Sample locations will be identified and flagged using the Geodimeter® survey instrumentation following procedure EQT-05, *Geodimeter® 4000 Survey System - Operation, Maintenance, and Calibration*. Figure 2 shows the planned sample locations, which will be finalized in the field and surveyed. Final sample locations must be within one foot of the planned locations and cannot cross CU boundaries. If a sample point falls on a disturbed surface soil location, the sampling point may be moved up to one

foot. Any exception must be approved by the Characterization Lead and documented in a Variance/Field Change Notice Form (V/FCN), which must be approved by the regulatory agencies.

2.4 HPGe GAMMA MEASUREMENTS

Per requirements of the SEP, HPGe measurements will be obtained at each surveyed certification sampling location to support studies on their comparability with analytical results. The HPGe readings are collected only for the purpose of evaluating their comparability with analytical results, and will not be used to make certification decisions, nor will they be reported in the Certification Report. HPGe detector operations will be performed in accordance with procedure EQT-23, *Operation of ADCAM Series Analyzers With Gamma Sensitive Detectors*. Moisture/density measurements taken in conjunction with each HPGe measurement will be performed in accordance with procedure EQT-32, *Troxler 3440 Series Surface Moisture/Density Gauge - Calibration, Operation, and Maintenance.* System calibration activities for HPGe detectors will be performed in accordance with procedure EQT-22, *Characterization of Gamma Sensitive Detectors.*

One HPGe reading will be obtained at each certification sampling location for CUs A1PI-ST2-SB and A1PI-ST3-SB only. HPGe measurements will not be taken on the berm CUs or the CUs beneath the berm. The HPGe detector system acquisition time will be set to 900 seconds (15 minutes). The detector height will be set at one foot above ground surface. Target analytes of all HPGe readings will be total uranium, radium-226 and thorium-232. One duplicate HPGe reading will be obtained per CU using the same detector height and acquisition time. The duplicate will be collected immediately at the same location following the original measurement.

2.4.1 HPGe Measurement Identification

The HPGe measurement numbering format will be comprised of a prefix designating the area name, A1PI (note that the number "1" is used in place of the Roman numeral "I" for data management purposes), followed by a CU number (ST2-SB or ST3-SB), followed by the sample number within in the area (1 through 16), followed by the letter "G" designating a gamma sample, followed by the letter "D" for a duplicate sample, if applicable. For example: *A1PI-ST2-SB-10G-D* is the duplicate gamma reading taken at the tenth certification sampling location within ST2-SB.

2.4.2 Surface Soil Moisture Gauge Measurements

Surface moisture gauge measurements will be obtained in order to correct the real-time data for these variables so the data are representative of the same environmental conditions as the physical samples. Surface moisture measurements will be obtained at each HPGe measurement point. These measurements will be conducted within eight hours of the HPGe measurements if environmental conditions are not expected to change. Technicians cannot collect these measurements simultaneously with HPGe readings because internal radioactive sources contained in the moisture gauge can interfere with the HPGe. If surface soil conditions are unsuitable for moisture gauge measurements, a soil core will be collected and assigned an identification number the same as the associated HPGe measurement, then submitted to the on-site laboratory for moisture analysis.

2.4.3 Background Radon Monitoring

A background radon monitor will be utilized during the collection of HPGe measurements to obtain background radon information from the time before data collection begins until after the final measurement is completed. The monitor will be placed in one location for the entire day where it will be set at a height of one foot to collect continuous data and record background radon information at 15-minute intervals.

2.5 SOIL SAMPLE COLLECTION

Samples from the berm and beneath the berm CUs (A1PI-ST2-BM, A1PI-ST2-BB, A1PI-ST3-BM, A1PI-ST3-BB) will be collected using the Geoprobe® Model 5400 in accordance with procedure EQT-06, *Geoprobe® Model 5400-Operation and Maintenance* or using manual methods as specified in Procedure SMPL-01, *Solids Sampling*. The Geoprobe® sampling system will be used for sample locations that will support the safe operation of the Geoprobe® vehicle. Hand augering or direct-push liner sampling will be conducted in the sediment basin CUs (A1PI-ST2-SB, A1PI-ST3-SB and top of berms A1PI-STP2-BM and A1PI-STP3-BM). At each sampling location, any surface vegetation within a 6-inch radius of the sample point will be removed using a stainless steel trowel or by hand with clean nitrile gloves while taking care to minimize the removal of any soil.

All soil samples will be collected from a discrete 0 to 6-inch depth interval from the berm and sediment basin CUs. A 0 to 6-inch depth interval will be taken from the CU beneath the berm once native soil is encountered. If refusal or resistance is encountered during the soil borings, up to two

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additional borings within a one-foot radius of the original point should be attempted in order to collect the specified samples.

2.5.1 Geoprobe® Methods

A Geoprobe® Macro-core sampler will be advanced in approximately 12 to 42-inch increments to collect the soil samples beneath the berm CUs. The Macro-core collects a 1.5-inch diameter soil core. Multiple cores may be collected at each sampling location (not to exceed one foot apart) to obtain sufficient sample volume for analysis if necessary. Borehole collapse will be monitored during core sampling to ensure minor sidewall slough is accounted for during coring and sample collection. If significant borehole collapse occurs, a closed tube piston-type core sampler (Macro-core) will be employed which is closed during advancement to the sample interval, then opened to collect the discrete interval of interest. Both core sampling methods will utilize an expendable plastic liner insert in which the soil core is recovered. All holes will be backfilled with bentonite grout pellets and hydrated.

2.5.2 Manual Sampling Methods

The samples from the sediment basin CUs (A1PI-ST2-SB, A1PI-ST3-SB and top of basins) will be collected using a hand auger (typically 3-inch diameter) or direct-push liner in accordance with SMPL-01, *Solids Sampling*. The hand auger will be advanced in approximately 6-inch increments down to the target depth intervals for the soil samples specified in Appendix B. As with core sampling, multiple holes at one sampling location (not to exceed one foot apart) may have to be augered to obtain sufficient volume for laboratory analyses, particularly for split sampling intervals. Borehole collapse will be monitored during core sampling to ensure sidewall slough is accounted for during augering and sample collection. The borehole will be manually collapsed following sample collection to eliminate the possibility of injury to workers. For surface samples, a direct-push liner (6-inch length) may be used to collect the sample from the 0 to 6-inch interval. All holes deeper than six inches will be backfilled with bentonite grout pellets and hydrated.

2.5.3 Soil Sample Processing and Analysis

The Geoprobe® soil core(s) will be laid on clean plastic and the appropriate sample increments, as defined in Appendix B, will be separated from the core to obtain the necessary samples. Any debris (i.e., wood, concrete, metal) contained in a sample interval will excluded from the sample in the field.

If one core provides the volume of soil necessary for the laboratory analysis, the sample will be placed directly into a sample container(s) and sealed. For manual sampling locations, the soil cuttings collected from the target sample interval will be placed in a clean tray prior to transfer to the sample container.

To meet the quality control requirements, twice the sample volume will be collected at the following locations: A1PI-ST2-SB-01, A1PI1-ST2-BM-02, A1PI-ST2-BB-02, A1PI-ST3-SB-01, A1PI1-ST3-BM-02, A1PI-ST3-BB-02. The soil will then be homogenized, then split according to SMPL-21, Section 6.6. Note that SMPL-21 refers to this as a split sample, but it will serve the purposes of the duplicate sample required by the SEP. All samples, including duplicates, will be assigned a unique sample identification number as identified in Appendix B.

2.6 TARGET ANALYTE LISTS AND ANALYTICAL METHODOLOGY

Area specific contaminants of concern (ASCOCs) were developed for each group of CUs within the scope of this PSP. Target Analyte Lists (TALs) based on the ASCOCs are listed in Tables 2-1 through 2-4 and in Appendix B.

For samples being submitted for radiological analyses:

Table 2-1
TAL A - Radiological

Total Uranium
Radium-226
Radium-228
Thorium-228
Thorium-232

For samples being submitted for metal analyses:

Table 2-2
TAL B - Metals

Arsenic
Beryllium

Laboratory analysis of certification samples will be conducted using approved laboratory methodology. The following tables summarize the sampling and analytical requirements.

Table 2-3
Sampling Requirements

Target Analyte List	Sample Matrix	Holding Time	Container/Weight
TAL A Radiological	Solid	6 months No preservative	1-3" diameter liner (1000g)*, 1-2" diameter liner (500g), or 500 ml Glass or Plastic
TAL B Metals	Solid	6 months Cool 4 °C	2" diameter liner or 500 ml Glass or Plastic (100g minimum)

* Note: One 300g sample for radiological samples collected beneath the berm (i.e., A1PI-ST-BB samples in Appendix B).

Further analytical requirements are stated in the statements of work to the laboratories. Note that all isotopic thorium analyses will be done using the gamma spectroscopy.

All samples will be submitted for ASL D analysis as described in the SCQ, and will be reported with ASL D data packages. The radiological constituents will be analyzed with ASL E detection limits, which will be set at 1/10 of the FRL.

3.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

3.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

The Field Quality Control, Analytical and Data Validation requirements are as follows:

- Field Quality Control requirements include one duplicate in each CU, as noted in Appendix B.
- All analyses will be performed at ASL D, with ASL D data packages.
- An ASL D package will be provided for each sample, and one CU per sediment trap will be validated or 1/3 of the data. Since the samples are being collected, batched into a release, and analyzed on a CU basis, the following CUs will be validated: A1PI-ST2-BB and A1PI-ST3-BM. If any of the data are rejected, the entire data set will be validated.
- A rinsate will be taken for every 1 in 20 hand augered sample, and one rinsate per 1 in 20 cutting shoe.
- Container blank.

Once all data are validated, results will be entered into the Sitewide Environmental Database and a statistical analysis will be performed to evaluate the pass/fail criteria for the each CU. The statistical approach is discussed in Section 3.4.3 and Appendix G of the SEP. This work is being performed per the requirements as stated in DQO SL-043 (Appendix A).

3.2 PROCEDURES AND MANUALS

To ensure consistency and data integrity, field activities in support of the PSP will follow the requirements and responsibilities outlined in the procedures and guidance documents referenced below.

ADM-02, Field Project Prerequisites
DRL-02, Solids Sampling in Drilled Boreholes
EQT-05, Geodimeter® 4000 Surveying System - Operation, Maintenance, and Calibration
EQT-06, Geoprobe® Model 5400 - Operation and Maintenance
SMPL-01, Solids Sampling
SMPL-21, Collection of Field Quality Control Samples
SDP 766-S-1000, Shipping Samples to Offsite Laboratories
EQT-33, Real Time Differential Global Positioning System Operation
Trimble Pathfinder Pro-XL GPS Operation Manual
Sidewide CERCLA Quality Assurance Plan (SCQ)

3.3 INDEPENDENT ASSESSMENT

Independent assessment will be performed by the FEMP Quality Assurance (QA) organization by conducting a surveillance. Surveillances conducted will consist of monitoring/observing on-going project activity and work areas to verify conformance to specified requirements. Surveillances will be planned and documented in accordance with Section 12.3 of the SCQ.

3.4 IMPLEMENTATION OF CHANGES

Before the implementation of changes, the Characterization and Sampling Manager will be informed of the proposed changes. Once the Characterization and Sampling Manager has obtained written or verbal approval (electronic mail is acceptable) from the Area Project Manager and QA for the changes to the PSP, the changes may be implemented. Changes to the PSP will noted in the applicable field activity logs and on a Variance/Field Change Notice Form (V/FCN). QA must receive the completed V/FCN, which includes the signatures of the Characterization and Sampling Manager, Area Project Manager, and QA within seven days of implementation of the change.

4.0 EQUIPMENT DECONTAMINATION

Sampling equipment that contact the sample media will be decontaminated at Level II per Procedure SMPL-01 (Section 6.11), *Solids Sampling*, prior to transport to the field, between sample intervals, and again, after all sampling is completed to limit the introduction of contaminants from equipment to sample media and protection of worker safety and health. Other equipment that does not fully contact the media to be sampled may be decontaminated at Level I, or wiped down using disposable towels (e.g., liner drive head).

5.0 HEALTH AND SAFETY

All work will be performed in accordance with applicable Environmental Monitoring Project Procedures, RM-0021, Safety Performance Requirements Manual, FDF Work Permit, Radiation Work Permit, Penetration Permit, and other applicable permits. Concurrence with applicable safety permits by each team member assigned to this project will be indicated by signing the briefing record.

All FDF and subcontract personnel working on any portion of the project that utilizes a subcontractor drilling company will be briefed on and comply with the Project Specific Health and Safety Matrix.

The Field Safety Contact will ensure that each team member performing sampling related to this project has been briefed on the applicable permits and the Project Specific Health and Safety Matrix, as applicable. Additionally, team members must be trained to applicable procedures listed in Section 3.2. Personnel who do not sign the Health and Safety documents or who are not trained to the applicable procedures will not participate in the execution of sampling activities related to the completion of assigned project responsibilities. A copy of the applicable safety permits/surveys issued for worker safety and health will be available at each sample location area.

All emergencies shall be reported immediately to the site communication center at 648-6511 or by contacting "control" on the radio.

6.0 DISPOSITION OF WASTES

During sampling activities, the field sampling team may generate contact waste and decontamination waste. These waste streams will be managed in accordance with SCEP Waste Disposition Support Services (WDSS) through the Project Waste Identification Document (PWID) process. Excess soil will be left on the surface at the sampling location. Generation of decontamination waters will be minimized in the field; wherever possible, equipment will be decontaminated at a facility that discharges to the Advanced Waste Water Treatment Facility, either directly or indirectly through the stormwater collection system. Contact waste generation will be minimized by limiting contact with the sample media, and by using only necessary disposable materials. This waste stream will be evaluated against dumpster criteria using the PWID process. If the materials do not meet dumpster criteria, an alternative disposal option will be identified. The Waste Disposition Contact will be contacted by the Area Project Manager prior (one week if possible) to the start of boring activities to initiate the PWID process.

7.0 DATA MANAGEMENT

A data management process will be implemented during the PSP to properly manage collected information upon completion of the field activities and to supplement existing information that will be used for remedial design and remedial action. As specified in Section 5.1 of the SCQ, sampling teams will describe daily activities on the Field Activity Log (FAL) in sufficient detail so that the sampling team may reconstruct a particular situation without reliance on memory. Sample Collection Logs, Lithologic Logs, and Borehole Abandonment Records will be completed according to instructions specified in Appendix B of the SCQ and applicable procedures.

Electronically recorded data (e.g. Geodimeter) will be downloaded to disks as soon as schedules permit. Team members will review the data for completeness and accuracy, and then download the data to the FEMP local area network (LAN). When the data are on the LAN, the Data Management Lead will perform an evaluation of the data and produce an error file and a compressed archive data file. Once complete, the data will be sent to a loader where it will be loaded onto the Oracle system and an error log will be generated. The data will be made available to users through both the Graphical Information System (GIS) and Microsoft Access software.

Field documentation, such as the FAL, will undergo an internal QA/QC review by field team members. Copies will be delivered to the Data Management Contact, who will evaluate the data and create the appropriate links between electronic and paper data. The paper data will then be sent to data entry personnel who will input it into the Oracle system. Field packages will be validated by the QA validation team.

Analytical data from on-site and off-site laboratories will be reported in preliminary form to the Area Project Manager by the laboratory contact as soon as the data are available in the FACTS database. Following validation of the data for each sample release, the data for that release will be reported to the Project Characterization Lead in the final data report format. The CUs as specified in Appendix B will be validated by the QA validation team. Qualified data will be entered into the Sitewide Environmental Database.

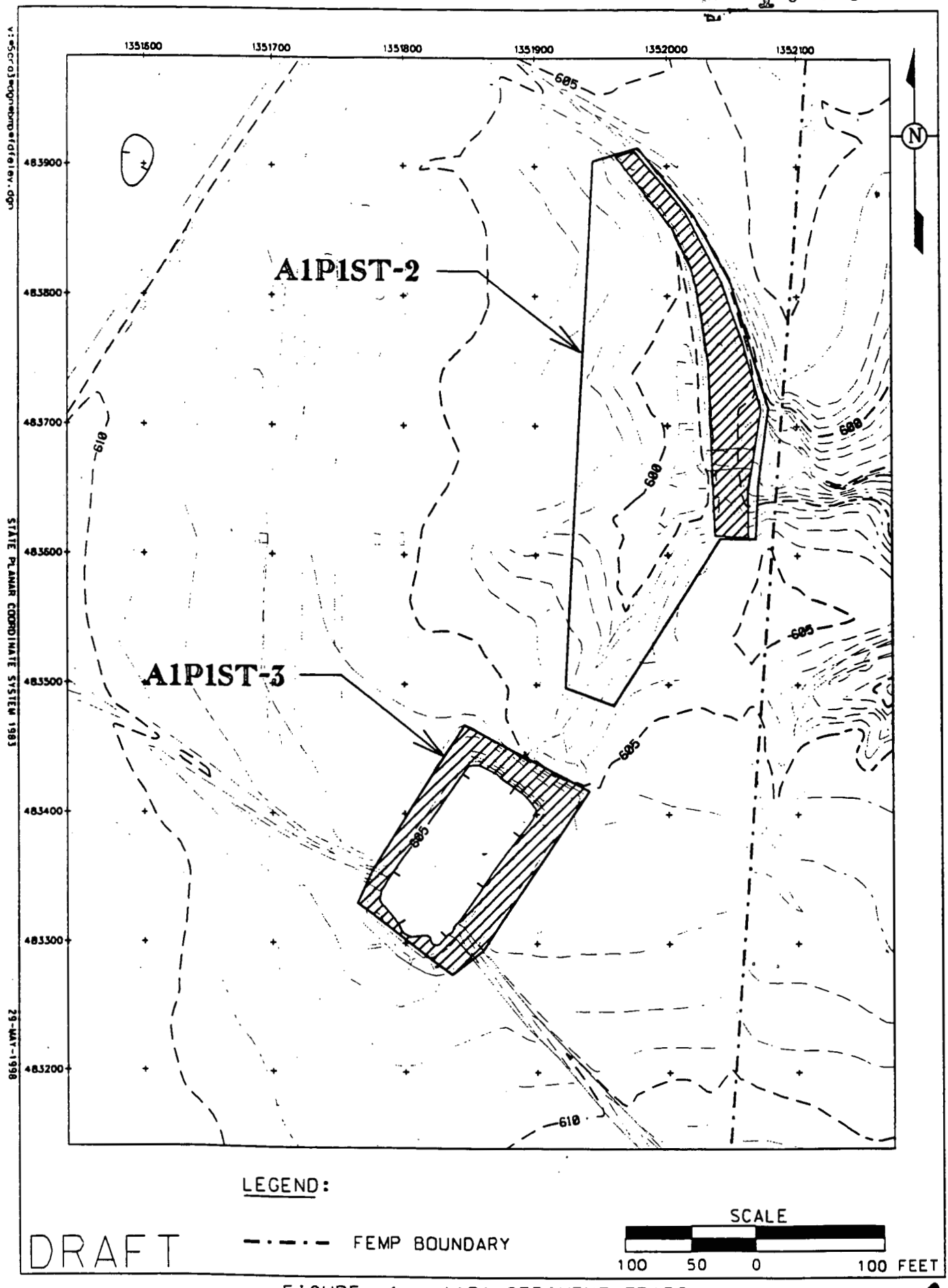

FIGURE 1. A1P1 SEDIMENT TRAPS

/gis/5csk4/dgn/bmp/a1ex-005.dgn

1351700 1351750 1351800 1351850 1351900 1351950 1352000 1352050 1352100

483900 483850 483800 483750 483700 483650 483600 483550 483500 483450 483400 483350 483300 483250

STATE PLANAR COORDINATE SYSTEM 1983

17-JUL-1998

A1PI-ST2-SB

SEDIMENT BASIN
CERTIFICATION UNIT

BERM AND BENEATH BERM
CERTIFICATION UNITS

A1PI-ST2-BM
A1PI-ST2-BB

SEDIMENT BASIN
CERTIFICATION UNIT

A1PI-ST3-SB

A1PI-ST3-BM
A1PI-ST3-BB

BERM AND BENEATH BERM
CERTIFICATION UNITS

N

LEGEND:

● SAMPLE LOCATION

—·—·— FEMP BOUNDARY

SCALE

50 25 0 50 FEET

DRAFT

9021

FIGURE 2. CU DESIGN AND SAMPLE LOCATIONS

APPENDIX A

DATA QUALITY OBJECTIVE NO. SL-043

UNCONTROLED

Fernald Environmental Management Project

Data Quality Objectives

Title: Sitewide Certification Sampling and Analysis

Number: SL-043

Revision: 0

Effective Date: July 11, 1997

Contact Name: Eric Kroger

Approval: (signature on file) Date: 7/14/97
William D. Kelley
DQO Coordinator

Approval: (signature on file) Date: 7/14/97
Keith Nelson
Project Lead

Rev. #	0						
Effective Date:	7/14/97						

DATA QUALITY OBJECTIVES
Sitewide Certification Sampling and Analysis

Members of Data Quality Objectives (DQO) Scoping Team

The members of the scoping team included individuals with expertise in QA, analytical methods, field sampling, statistics, laboratory analytical methods and data management.

Conceptual Model of the Site

Soil is considered contaminated if the concentration of one or more area-specific constituents of concern (ASCOCs) in a certification unit (CU) exceed the final remediation levels (FRLs), as published in the operable unit Records of Decision. The extent of soil contamination was estimated and published in the Operable Unit (OU) 5 Feasibility Study (FS). These estimates were based on kriging analysis of available uranium data for soil collected during the Remedial Investigation (RI) effort and other FEMP environmental studies. Maps outlining contaminated soil boundaries were generated for the OU5 FS by overlaying the results of the kriging analysis of uranium data with isoconcentration maps of the other constituents of concern (COCs), as presented in the OU5 RI report, and further modified by spatial analysis of maps reflecting the most current soil characterization data. A sequential remediation plan has been presented which subdivides the FEMP into seven major construction areas. Extensive historical sampling has demonstrated that in each of these seven areas, a subset of the ASCOCs is present. These ASCOCs need to be evaluated against soil FRLs in the certification process within each of the individual construction areas, and at off-property locations against off-property soil FRLs. The certification sampling and analysis program supports a sequential process for site remediation by documenting that each of these seven construction areas, or phase areas within the construction areas, have met their area-specific soil FRLs published in the specific Operable Unit Records Of Decision (RODs).

1.0 Statement of Problem

Soils contaminated by former FEMP operations need to be certified for compliance with the FRLs of all ASCOCs. The appropriate sampling, analytical and data management criteria must be developed to provide the required qualified data necessary for certification compliance. For every area undergoing certification, a sampling plan must be in place that will direct soil samples to be collected which are representative of the ASCOC concentrations. The appropriate analytical methodologies must be selected to provide the required data.

Exposure to Soils

The cleanup standards, or FRLs, were developed for a final site land use as an

undeveloped park. Under this exposure scenario, receptors could be directly exposed to contaminated soils through dermal contact (non-radiological COCs), external radiation (radionuclides), incidental ingestion, and/or inhalation of fugitive dust while visiting the park. Exposure to contaminated soil by the modeled receptor is expected to occur at random locations within the boundaries of the FEMP and would not be limited to any single area. Some soil FRLs were developed based on the modeled cross-media impact potential of soil contamination to the underlying aquifer. In these instances, potential exposure to contaminants would be indirect through the groundwater pathway, and not directly linked to soil exposure. Benchmark Toxicity Values (BTVs) are also being considered in the cleanup process by assessing habitat impact for individual BTVs under post-remedial conditions.

Available Resources

Time: Certification sampling will be accomplished by the field team of samplers prior to final regrading or release of soils for construction activities. The certification sampling schedule must allow sufficient time, in the event additional remediation is required, to demonstrate certification of FRLs prior to permanent construction or regrading. Certification sampling will have to be completed and analytical results validated prior to submission of a certification report to the regulatory agencies.

Project Constraints: Certification sampling and analytical testing must be performed with existing manpower and materials to support the certification effort. Construction areas are prioritized for certification sampling and analysis according to the date required for initiation of sequential construction activities in those areas. Remediation began with the excavation of Area 1 Phase 1 in the fall of 1996. Fluor Daniel Fernald (FDF) and DOE must demonstrate post-remedial compliance with the FRLs in designated construction areas to release the areas for planned construction activities, interim grading, and eventual restoration under the Natural Resources Restoration Plan (NRRP).

2.0 Identify the Decision

Decision

Demonstrate, on a CU basis in areas to be certified, whether the average concentration of each ASCOC is below the FRL and within the agreed upon confidence limits (95% for primary ASCOCs and 90% for secondary ASCOCs). Also, demonstrate that no result for any ASCOC is more than two times the associated soil FRL.

Possible Results

1. The average concentration of each ASCOC within the CU can be

demonstrated to be below the FRLs within the confidence level, with no single result for any ASCOC greater than two times the associated FRL. The CU can then be certified as having achieved cleanup standards.

2. The average concentration of at least one ASCOC for a CU is demonstrated to be above the FRL at the given confidence level. The CU will fail certification and require additional FDF management assessment.

3. If a result(s) of any one of the ASCOCs for the CU is demonstrated to be two times the FRL, the CU will fail certification. The CU will fail certification and require additional FDF management assessment. A combination of results 2 and 3 also constitutes certification failure.

3.0 Inputs That Affect the Decision

Required Information

Based on analytical results of certification sampling, the average concentrations of ASCOCs in individual CUs, using agreed-upon confidence levels, will be calculated using the statistical approach referenced in the Sitewide Excavation Plan (SEP) and individual PSPs.

Source of Information

Analysis of certification samples for ASCOCs will be conducted at analytical support level (ASL) D(chemical) and D*(radiological) in accordance with methods and QA/QC standards in the FEMP Sitewide CERCLA Quality Assurance Project Plan [SCQ (DOE 1993)] with modifications made for radiological analyses to modify the detection limits requirements to the project. The QA/QC standards include field duplicate samples with minimum frequency of one per CU or 1 per 20 samples, whichever is more frequent. Field record logs will be validated to verify that field activities provide the required samples for CU certification.

Contaminant-Specific Action Levels

The cleanup levels are the soil FRLs published in the OU5 ROD (see Table 1). In the Area 2, Phase I (A2PI) Integrated Remedial Design Package (IRDP) for each construction area, a subset of the compounds listed in Table 1 will be selected as ASCOCs for each of the individual construction areas, and will be certified for the associated FRLs. In the A2PI Southern Waste Units, the list of ASCOCs is defined in the OU2 ROD, while the more stringent of the OU2 and OU5 FRLs for these ASCOCs are established as the FRLs for this project. Table 2 identifies the subset of ASCOCs and FRLs for A2PI. BTVs being considered in the remediation process are published in the OU5 Ecological Risk Assessment and are being reviewed for site consideration in the (NRRP).

Methods of Sampling and Analysis

Samples will be collected in accordance with the PSPs and applicable site sampling procedures. Laboratory analysis for ASCOCs will be conducted at ASL D (chemical) and D* (radiological) using QA/QC protocols specified in the SCQ. For radiological analyses, the Highest Allowable Minimum Detection Capability (HAMDC) may be modified to adapt to the FRLs, instead of the RI/FS detection limits which were the basis for the SCQ. Full raw data deliverables will be required from the laboratory to allow for complete data validation. For FEMP-approved on- and off-site laboratories, methodologies will be evaluated prior to use to verify that they have the required precision and detection capabilities necessary to achieve FRL analyte ranges.

4.0 The Boundaries of the Situation

Spatial Boundaries

Domain of the Decision: The boundaries of this certification DQO extend to all post-excavation surface soil in areas that are undergoing certification as part of FEMP remediation.

Population of Soils: Surface soil includes all excavated surfaces, defined sub-surface intervals, and undisturbed, relatively unimpacted native soils in areas undergoing certification sampling and analysis.

Scale of Decision Making

Based on considerations of the final certification units and the constituent of concern evaluation process, the ASCOCs for specific areas were determined. The area undergoing certification will be evaluated on a CU basis as to whether it has passed or failed the certification criteria.

Temporal Boundaries

Time frame: Certification sampling must be performed in time to sequentially release certified areas for scheduled construction, regrading, and other final land use activities. Certification sampling data must be received from the laboratory, evaluated and compiled, and final certification reports written, issued, and submitted to the regulatory agencies for their review, prior to release of the areas for construction, regrading or other final land use.

Time Constraints on Sampling: The scheduling of certification must allow time for the collection of samples, analysis, data verification and validation, and development of the certification reports. The certification report must be submitted to the regulators for their concurrence prior to the beginning of construction and/or regrading in the applicable work area.

Practical Considerations: Some areas undergoing remediation will be made accessible for certification sampling by decontamination/demolition and excavation. Other areas such as wooded land that is not planned for excavation may require preparation, such as cutting of grass or removal of undergrowth prior to certification sampling, thus requiring coordination with FEMP Maintenance personnel.

5.0 Decision Rule

Parameters of Interest

The parameters of interest are the average surface soil concentrations of ASCOCs and confidence limits on the calculated average within a CU. Table 1 contains a list of sitewide soil constituents of concern (COCs) developed by OU5, a subset of which will be selected as ASCOCs for each construction area undergoing certification sampling and analysis. Area 2, Phase 1 (A2PI, the Southern Waste Units) is an exception, as a list of ASCOCs and FRLs developed by OU2 must also be considered when establishing A2PI Final FRLs (see Table 2). In addition, all parameters evaluated for WAC attainment or certification readiness will be included in the suite of parameters to certify.

Action Levels

The action levels are specific to the construction area. They are the soil FRLs published in the OU5 ROD for each ASCOC, except in Area 2, Phase 1 where the more stringent of the combined sets of OU2 and OU5 soil FRLs has been established as the FRL for each of the OU2 ASCOCs as discussed above.

Decision Rules

If the average radiological and chemical contamination for each ASCOC in each CU is demonstrated to be below the FRLs within the agreed upon confidence level (95% for primary COCs; 90% for secondary COCs), and no analytical result exceeds two times the soil FRL, then the CU can be certified as complying with the cleanup criteria. If a CU does not meet the FRLs within the agreed upon confidence level for one or more ASCOCs, or one or more analytical results for one or more ASCOCs is greater than two times the associated soil FRL, then the failed CU requires additional FDF management assessment.

6.0 Use of Data to Test Null Hypothesis

Based on the certification analytical data, the following formula will be used to test the null hypothesis for the soil concentration of each ASCOC within a CU subjected to certification sampling and analysis:

$$t = \frac{FRL - \bar{x}_i}{\sqrt{S_i^2/(n)}}$$

where:

t = critical value
FRL = final remediation level
$\bar{x}_i$ = mean of the i^{th} CU
S^2_i = sample variance of the i^{th} CU
n = number of samples from the i^{th} CU.

If the computed value (t) exceeds the critical value of a t-distribution for alpha = 0.05 for primary ASCOCs and 0.10 for secondary ASCOCs, at n-1 degrees of freedom, then the null hypothesis is rejected and the CU is certified as having average ASCOC concentrations below the applicable FRL.

7.0 Limits on Decision Errors

Range of Parameter Limits

The expected and reasonable range of ASCOC concentrations in soils undergoing certification sampling is from natural background (for COCs with natural background levels) to the expected post-remedial action level; however, the upper limit could be greater than the maximum values identified in the soils database.

Types of Decision Errors and Consequences

Definition

Decision Error 1: This decision error occurs when the decision maker decides a CU is in compliance with FRLs (average below the FRL) when in reality the actual average and/or confidence level is still above one or more FRLs. This situation could result in an increased risk to human health and the environment. In addition, this type of error could result in regulatory fees and penalties.

Decision Error 2: This decision error occurs when the decision maker decides a CU is contaminated (average at or above the FRL) when the CU average is actually below the action level(s). This error would result in unnecessary added costs due to the excavation of allowable residual soils and increased volume of soils assigned to the OSDF. In addition, unnecessary delays in the remediation schedule may result.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the actual average concentration of an ASCOC in soil is greater than the action level. The true state of nature for Decision Error 2 is that the actual average concentration of an ASCOC is below the action level for FRLs. Decision Error 1 is the more severe error due to potential threat this poses to human health and the environment.

Null Hypothesis

H_0: The average concentration of at least one ASCOC in the CU is equal to or greater than the action levels.

H_1: The average concentration of all ASCOCs in the CU is less than the action levels.

False Positive and False Negative Errors

A false positive is Decision Error 1: less than or equal to five percent is considered the acceptable decision error in determination of compliance with FRLs for primary ASCOCs, while ten percent is used for secondary ASCOCs.

A false negative is Decision Error 2: less than or equal to 20 percent is considered the acceptable decision error. This decision error is controlled through the determination of sample sizes (See Section 8.0)

8.0 Design for Obtaining Quality Data

General Sampling and Analysis Design

A sampling design will be developed to collect discrete samples from each CU. Discrete samples will be collected using a systematic random sampling grid by dividing each CU into 16 approximately equal subunits. A sample point will be randomly located within each subunit, and sampled using approved methodology, as described in the Project Specific Plans (PSPs). A specified quantity of soil will be obtained from each sample point in order to satisfy analytical requirements.

Each sample will be submitted to FEMP-approved laboratories for the appropriate ASL D (chemical) or D*(radiological) analysis (acceptable analytical methods and/or performance criteria are defined in the FEMP SCQ). For radiological analyses, the Highest Allowable Minimum Detection Capability (HAMDC) may be modified to adapt the data quality to the FRLs, instead of the RI/FS detection limits which were the basis for the SCQ. FDF will specify to the laboratory the appropriate number and type of method QA/QC samples based on the type of analysis and number of samples as defined in the SCQ. Laboratory data deliverables will include summary forms and raw data. Selected methodologies will be reviewed prior to use to

insure that they provide sufficient sensitivity and precision.

Field QC will include field duplicates at a minimum frequency of one per CU or 1 per 20 samples, whichever is more frequent. Rinsates of sampling material will be performed where equipment is reused. Although required at ASL D, traditional field blanks will not be collected since areas being certified have been characterized as not exhibiting impacts from site contamination. A limited number of rinsates of the sleeves used as sample containers will be used as container blanks, to provide a level of confidence that these containers are not a source of contamination. Trip blanks will be collected for volatile organic sampling.

A 100% review of the data per the requirements of the PSP, including a minimum of 10% field validation and 10% full data validation of data packages to ASL D, will be performed by either the FDF validation team or subcontract validation team.

Resource Effective Design

The number of samples required to demonstrate statistical confidence is determined based on variability of existing historical sample data in areas not contaminated above the FRLs. The minimum number of samples determined per CU (reference the SEP) represent the number of samples required to minimize decision errors in the estimate of the mean under a discrete sampling program. This sampling program is based on the assumptions of variability, maximum expected mean soil concentrations, and acceptable probabilities of error. The maximum expected mean soil concentration is based on engineering design, and estimates that the average concentrations of ASCOCs anticipated in post-remediation in residual soil is assumed to be 75% of the FRL. For simplicity, and to assure that the ASCOCs will be adequately sampled to achieve acceptable confidence levels, the minimum number of samples required to meet the confidence level for the group of primary COCs and the group of secondary COCs has been selected to achieve the desired confidence for all COCs within primary and secondary groups. Any additional samples per CU taken beyond the minimum as directed in individual certification PSPs will be included in the average ASCOC concentrations.

Details and Assumptions of the Design

The number of samples required to achieve statistical confidence is determined from the following equation:

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{\left(\frac{FRL - \bar{x}_{mean}}{s_{cu}}\right)^2}$$

Where:

n	=	number of samples required for statistical confidence
α	=	probability of a Type I Error (.05) (.10 - secondary)
β	=	probability of a Type II Error (.20)
FRL	=	the FRL for the given analyte
$\bar{x}_{target}$	=	target cleanup level average concentration = 75% of the FRL
S_{CA}	=	standard deviation estimated from clean areas (see discussion below)
$(Z_{1-\alpha} + Z_{1-\beta})^2$	=	the critical values for the normal distribution with probabilities 1-α and 1-β.

The target level prior to certification is assumed to be 75% of the FRL, i.e., the average soil concentration is no greater than 75% of the FRL.

An estimate of the variability (S_{ca}) for post-remedial conditions was based on estimates calculated from existing site characterization data. The concept was that the variability demonstrated in unimpacted areas would be similar to post-remedial conditions in impacted areas. The procedure used to estimate the clean area variability is as follows:

1. The site was divided into 100 ft. by 100 ft. blocks. This was accomplished by simply dividing the Northing and Easting coordinate by 100 since these coordinates are presented in feet.
2. Block averages were calculated based on historic data within each 100'x100' block for each COC evaluated.
3. Blocks were then categorized as either impacted (average greater than or equal to the FRL) or unimpacted (average less than the FRL).

4. All sample locations that were located in impacted blocks were then eliminated from consideration.
5. The final screening removed any individual sample that was in excess of three times the FRL since these sample values would immediately trigger a localized remedial effort.
6. From this residual (unimpacted) data set, the variability used in the equation was calculated.

Data Quality Objectives
Sitewide Certification Sampling and Analysis

1A. Task/Description: Certification Sampling Analysis

1.B. Project Phase: (Put an X in the appropriate selection.)

RI ☐ FS ☐ RD ☐ RA ☒ R_vA ☐ OTHER

1.C. DQO No.: SL-043 DQO Reference No.: _____

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2. Media Characterization: (Put an X in the appropriate selection.)

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐ Soil ☒

Waste ☐ Wastewater ☐ Surface water ☐ Other (specify) _____

---

3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable Data Use.)

Site Characterization
A ☐ B ☐ C ☐ D ☐ E ☐

Risk Assessment
A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives
A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design
A ☐ B ☐ C ☐ D ☐ E ☐

Monitoring during remediation activities
A ☐ B ☐ C ☐ D ☐ E ☐

Other
A ☐ B ☐ C ☐ D ☒* E ☐ **(Certification)**

* **Radiochemistry data will be specified as ASL E in the task orders, to allow the HAMDCs to be tailored to the project requirements, however, since all other QC is identical to the ASL D specifications in the SCQ, it is referred to in this task order as ASL D*, to better connote the designated QC requirements**

4.A. Drivers: Construction Area Remedial Action Work Plans, Applicable or Relevant and Appropriate Requirements (ARARs) and Operable Unit 2 and Operable Unit 5 Records of Decision (ROD)

4.B. Objective: Confirmation that excavation activities have remediated the site to below the Final Remediation Level (FRL) for area-specific constituents of concern.

5. Site Information (Description):

The OU2 and OU5 RODs have identified areas at the FEMP that require soil remediation activities. The RODs specify that the soils in these areas will be demonstrated to be below the FRLs. Certification will be necessary for areas of the site with soils that have been remediated to demonstrate that the residual soils do not contain contamination exceeding these levels at a specified confidence level.

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH	☐	2. Uranium	☒*	3. BTX	☐
Temperature	☐	Full Radiological	☒**	TPH	☐
Specific Conductance	☐	Metals	☒**	Oil/Grease	☐
Dissolved Oxygen	☐	Cyanide	☐		
Technetium-99	☒**	Silica	☐		

4. Cations	☐	5. VOA	☒**	6. Other (specify)
Anions	☐	BNA	☐	
TOC	☐	Pesticides	☒**	
TCLP	☐	PCB	☒**	
CEC	☐			
COD	☐			

* Total Uranium calculated from sum of uranium isotopes analyzed in gamma spectroscopy.

** See Tables 1 and 2.

6.B. Equipment Selection and SCQ Reference:

Equipment Selection	Refer to SCQ Section
ASL A _____	SCQ Section: _____
ASL B _____	SCQ Section: _____
ASL C _____	SCQ Section: _____

ASL D Per SCQ, PSP and Task Order SCQ Section: APP. G , Tables 1 & 3

ASL E _____ SCQ Section: _____

7.A. Sampling Methods: (Put an X in the appropriate selection.)

Biased [X] Composite [X] Environmental [ ] Grab [X] Grid [ ]

Intrusive [X] Non-Intrusive [ ] Phased [ ] Source [ ]

DQO Number: SL-043

7.B. Sample Work Plan Reference: Project Specific Plan for the associated construction area Remedial Action Work Plan

Background samples: OU5 RI

7.C. Sample Collection Reference:

Sample Collection Reference: Associated PSP(s), SMPL-01

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8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks	[X] *	Container Blanks	[ ]
Field Blanks	[X] **	Duplicate Samples	[X]
Equipment Rinsate Samples	[X] **	Split Samples	[X] ***
Preservative Blanks	[ ]	Performance Evaluation Samples	[ ]

Other (specify)

*Collected for volatile organic sampling

** Limited rinsate sample(s) of the casings will be analyzed for metals and other applicable analytes of concern to provide a level of confidence that the casings are not a source of contaminants that would impact the levels of concern. Traditional field blanks will not be collected. Traditional rinsates will not be collected unless sampling equipment or shipping containers are reused.

*** Split samples will be collected where required by the EPA.

8.B. Laboratory Quality Control Samples:

Method Blank	[X]	Matrix Duplicate/Replicate	[X]
Matrix Spike	[X]	Surrogate Spikes	[X]
Tracer Spike	[X]		

Other (specify) _____

9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.

Sample density will be dependent upon the certification unit size. Proposed certification units will be identified in PSPs for each area.

TABLE 1
SIDEWIDE CONSTITUENTS OF CONCERN WITH ASSOCIATED SOIL FRLs [a,b]

Analytical Suites	Sitewide Constituents of Concern	FRL
Primary COCs		
Radiological	Total Uranium [c]	82 mg/kg
	Total Uranium [d]	20 mg/kg
	Radium-226	1.7 pCi/g
	Radium-228	1.8 pCi/g
	Thorium-228	1.7 pCi/g
	Thorium-232	1.5 pCi/g
Secondary COCs		
Radiological	Cesium-137	1.4 pCi/g
	Lead-210	38 pCi/g
	Neptunium-237	3.2 pCi/g
	Plutonium-238	78 pCi/g
	Strontium-90	1.4 pCi/g
	Technetium-99	30 pCi/g
	Thorium-230	280 pCi/g
Metals	Arsenic	12 mg/kg
	Beryllium	1.5 mg/kg
	Lead	400 mg/kg
	Manganese	4600 mg/kg
Organics	Aroclor-1254	0.13 mg/kg
	Aroclor-1260	0.13 mg/kg
	Benzo(a)anthracene	20 mg/kg
	Benzo(a)pyrene	2 mg/kg
	Benzo(b)fluoranthene	20 mg/kg
	Carbazole	12 mg/kg
	Dibenzo(a,h)anthracene	2 mg/kg
	1,1-Dichloroethene	0.41 mg/kg
	Dieldrin	0.015 mg/kg
	Heptachlorodibenzo-p-dioxin	0.00088 mg/kg
	Indeno(1,2,3-cd)pyrene	20 mg/kg
	Octachlorodibenzo-p-dioxin	0.0088 mg/kg
	Trichloroethene	25 mg/kg

[a]A subset of this list from the OU5 ROD composes the ASCOCs for each individual remediation area.
[b]Additional ASCOCs or more stringent FRLs may be identified in construction area Certification

PSPs.

[c]For all soil outside of the Production Area, Sewage Treatment Plant and Fire Training Facility.

[d]For soil within the Production Area, Sewage Treatment Plant and Fire Training Facility.

TABLE 2

AREA 2, PHASE 1 AREA SPECIFIC CONSTITUENTS OF CONCERN WITH ASSOCIATED SOIL FRLs [a]

Analytical Suites	Sitewide Constituents of Concern [b]	FRL
Primary COCs		
Radiological	Total Uranium	24.8 mg/kg
	Radium-226	1.7 pCi/g
	Radium-228	1.8 pCi/g
	Thorium-228	1.7 pCi/g
	Thorium-232	1.5 pCi/g
Secondary COCs		
Radiological	Neptunium-237	3.2 pCi/g
	Technetium-99	30 pCi/g
	Thorium-230	280 pCi/g
	Uranium-234	4.42 pCi/g
	Uranium-235/236	3.35 pCi/g
	Uranium-238	3.22 pCi/g
Metals	Arsenic	12 mg/kg
	Lead	400 mg/kg
Organics	Aroclor-1260	0.13 mg/kg
	Benzo(a)anthracene	0.455 mg/kg
	Benzo(a)pyrene	0.777 mg/kg
	Benzo(b)fluoranthene	0.513 mg/kg
	Benzo(k)fluoranthene	0.603 mg/kg
	Dibenzo(a,h)anthracene	0.157 mg/kg
	Dieldrin	0.015 mg/kg
	Phenanthrene	0.19 mg/kg

[a]Area 2, Phase I is the only remediation area with ASCOCs/FRLs different from those identified as sitewide COCs in the OU5 ROD, as seen on Table 1.

[b]Taken from the OU2 ROD; the most stringent FRL from OU2 or OU5 ROD is used.

APPENDIX B

SAMPLE IDENTIFIERS, TARGET ANALYTE LISTS, LOCATION AND VALIDATION INFORMATION

APPENDIX B

A1PI SEDIMENT TRAPS 2 and 3 CERTIFICATION

1706

Sample Identifiers, TALs, Locations, and Validation Information

Certification Unit	Sample ID	TAL List	Easting	Northing	Validation?
A1PI-ST2-BB	A1PI-ST2-BB-01M	TAL B	1352062	483625	Yes
A1PI-ST2-BB	A1PI-ST2-BB-01R	TAL A	1352062	483625	Yes
A1PI-ST2-BB	A1PI-ST2-BB-02M	TAL B	1352041	483628	Yes
A1PI-ST2-BB	A1PI-ST2-BB-02MD	TAL B	1352041	483628	Yes
A1PI-ST2-BB	A1PI-ST2-BB-02R	TAL A	1352041	483628	Yes
A1PI-ST2-BB	A1PI-ST2-BB-02RD	TAL A	1352041	483628	Yes
A1PI-ST2-BB	A1PI-ST2-BB-03M	TAL B	1352052	483647	Yes
A1PI-ST2-BB	A1PI-ST2-BB-03R	TAL A	1352052	483647	Yes
A1PI-ST2-BB	A1PI-ST2-BB-04MV	ARCHIVE	1352068	483669	Yes
A1PI-ST2-BB	A1PI-ST2-BB-04RV	ARCHIVE	1352068	483669	Yes
A1PI-ST2-BB	A1PI-ST2-BB-05M	TAL B	1352049	483691	Yes
A1PI-ST2-BB	A1PI-ST2-BB-05R	TAL A	1352049	483691	Yes
A1PI-ST2-BB	A1PI-ST2-BB-06M	TAL B	1352037	483706	Yes
A1PI-ST2-BB	A1PI-ST2-BB-06R	TAL A	1352037	483706	Yes
A1PI-ST2-BB	A1PI-ST2-BB-07M	TAL B	1352065	483709	Yes
A1PI-ST2-BB	A1PI-ST2-BB-07R	TAL A	1352065	483709	Yes
A1PI-ST2-BB	A1PI-ST2-BB-08MV	ARCHIVE	1352040	483728	Yes
A1PI-ST2-BB	A1PI-ST2-BB-08RV	ARCHIVE	1352040	483728	Yes
A1PI-ST2-BB	A1PI-ST2-BB-09M	TAL B	1352059	483753	Yes
A1PI-ST2-BB	A1PI-ST2-BB-09R	TAL A	1352059	483753	Yes
A1PI-ST2-BB	A1PI-ST2-BB-10M	TAL B	1352052	483775	Yes
A1PI-ST2-BB	A1PI-ST2-BB-10R	TAL A	1352052	483775	Yes
A1PI-ST2-BB	A1PI-ST2-BB-11M	TAL B	1352034	483773	Yes
A1PI-ST2-BB	A1PI-ST2-BB-11R	TAL A	1352034	483773	Yes
A1PI-ST2-BB	A1PI-ST2-BB-12MV	ARCHIVE	1352029	483796	Yes
A1PI-ST2-BB	A1PI-ST2-BB-12RV	ARCHIVE	1352029	483796	Yes
A1PI-ST2-BB	A1PI-ST2-BB-13M	TAL B	1352037	483813	Yes
A1PI-ST2-BB	A1PI-ST2-BB-13R	TAL A	1352037	483813	Yes
A1PI-ST2-BB	A1PI-ST2-BB-14M	TAL B	1352015	483848	Yes
A1PI-ST2-BB	A1PI-ST2-BB-14R	TAL A	1352015	483848	Yes
A1PI-ST2-BB	A1PI-ST2-BB-15M	TAL B	1351995	483880	Yes
A1PI-ST2-BB	A1PI-ST2-BB-15R	TAL A	1351995	483880	Yes
A1PI-ST2-BB	A1PI-ST2-BB-16MV	ARCHIVE	1351968	483901	Yes
A1PI-ST2-BB	A1PI-ST2-BB-16RV	ARCHIVE	1351968	483901	Yes
A1PI-ST2-BM	A1PI-ST2-BM-01M	TAL B	1352062	483625	No
A1PI-ST2-BM	A1PI-ST2-BM-01R	TAL A	1352062	483625	No
A1PI-ST2-BM	A1PI-ST2-BM-02M	TAL B	1352041	483628	No
A1PI-ST2-BM	A1PI-ST2-BM-02MD	TAL B	1352041	483628	No
A1PI-ST2-BM	A1PI-ST2-BM-02R	TAL A	1352041	483628	No
A1PI-ST2-BM	A1PI-ST2-BM-02RD	TAL A	1352041	483628	No
A1PI-ST2-BM	A1PI-ST2-BM-03M	TAL B	1352052	483647	No
A1PI-ST2-BM	A1PI-ST2-BM-03R	TAL A	1352052	483647	No

APPENDIX B

A1PI SEDIMENT TRAPS 2 and 3 CERTIFICATION

1706

Sample Identifiers, TALs, Locations, and Validation Information

Certification Unit	Sample ID	TAL List	Easting	Northing	Validation?
A1PI-ST2-BM	A1PI-ST2-BM-04MV	ARCHIVE	1352068	483669	No
A1PI-ST2-BM	A1PI-ST2-BM-04RV	ARCHIVE	1352068	483669	No
A1PI-ST2-BM	A1PI-ST2-BM-05M	TAL B	1352049	483691	No
A1PI-ST2-BM	A1PI-ST2-BM-05R	TAL A	1352049	483691	No
A1PI-ST2-BM	A1PI-ST2-BM-06M	TAL B	1352037	483706	No
A1PI-ST2-BM	A1PI-ST2-BM-06R	TAL A	1352037	483706	No
A1PI-ST2-BM	A1PI-ST2-BM-07M	TAL B	1352065	483709	No
A1PI-ST2-BM	A1PI-ST2-BM-07R	TAL A	1352065	483709	No
A1PI-ST2-BM	A1PI-ST2-BM-08MV	ARCHIVE	1352040	483728	No
A1PI-ST2-BM	A1PI-ST2-BM-08RV	ARCHIVE	1352040	483728	No
A1PI-ST2-BM	A1PI-ST2-BM-09M	TAL B	1352059	483753	No
A1PI-ST2-BM	A1PI-ST2-BM-09R	TAL A	1352059	483753	No
A1PI-ST2-BM	A1PI-ST2-BM-10M	TAL B	1352052	483775	No
A1PI-ST2-BM	A1PI-ST2-BM-10R	TAL A	1352052	483775	No
A1PI-ST2-BM	A1PI-ST2-BM-11M	TAL B	1352034	483773	No
A1PI-ST2-BM	A1PI-ST2-BM-11R	TAL A	1352034	483773	No
A1PI-ST2-BM	A1PI-ST2-BM-12MV	ARCHIVE	1352029	483796	No
A1PI-ST2-BM	A1PI-ST2-BM-12RV	ARCHIVE	1352029	483796	No
A1PI-ST2-BM	A1PI-ST2-BM-13M	TAL B	1352037	483813	No
A1PI-ST2-BM	A1PI-ST2-BM-13R	TAL A	1352037	483813	No
A1PI-ST2-BM	A1PI-ST2-BM-14M	TAL B	1352015	483848	No
A1PI-ST2-BM	A1PI-ST2-BM-14R	TAL A	1352015	483848	No
A1PI-ST2-BM	A1PI-ST2-BM-15M	TAL B	1351995	483880	No
A1PI-ST2-BM	A1PI-ST2-BM-15R	TAL A	1351995	483880	No
A1PI-ST2-BM	A1PI-ST2-BM-16MV	ARCHIVE	1351968	483901	No
A1PI-ST2-BM	A1PI-ST2-BM-16RV	ARCHIVE	1351968	483901	No
A1PI-ST2-SB	A1PI-ST2-SB-01M	TAL B	1351953	483502	No
A1PI-ST2-SB	A1PI-ST2-SB-01MD	TAL B	1351953	483502	No
A1PI-ST2-SB	A1PI-ST2-SB-01R	TAL A	1351953	483502	No
A1PI-ST2-SB	A1PI-ST2-SB-01RD	TAL A	1351953	483502	No
A1PI-ST2-SB	A1PI-ST2-SB-02M	TAL B	1351948	483561	No
A1PI-ST2-SB	A1PI-ST2-SB-02R	TAL A	1351948	483561	No
A1PI-ST2-SB	A1PI-ST2-SB-03M	TAL B	1352008	483582	No
A1PI-ST2-SB	A1PI-ST2-SB-03R	TAL A	1352008	483582	No
A1PI-ST2-SB	A1PI-ST2-SB-04MV	ARCHIVE	1352024	483617	No
A1PI-ST2-SB	A1PI-ST2-SB-04RV	ARCHIVE	1352024	483617	No
A1PI-ST2-SB	A1PI-ST2-SB-05M	TAL B	1351962	483626	No
A1PI-ST2-SB	A1PI-ST2-SB-05R	TAL A	1351962	483626	No
A1PI-ST2-SB	A1PI-ST2-SB-06M	TAL B	1351987	483634	No
A1PI-ST2-SB	A1PI-ST2-SB-06R	TAL A	1351987	483634	No
A1PI-ST2-SB	A1PI-ST2-SB-07M	TAL B	1352039	483663	No
A1PI-ST2-SB	A1PI-ST2-SB-07R	TAL A	1352039	483663	No

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APPENDIX B
A1PI SEDIMENT TRAPS 2 and 3 CERTIFICATION

Sample Identifiers, TALs, Locations, and Validation Information 1706

Certification Unit	Sample ID	TAL List	Easting	Northing	Validation?
A1PI-ST2-SB	A1PI-ST2-SB-08MV	ARCHIVE	1351950	483682	No
A1PI-ST2-SB	A1PI-ST2-SB-08RV	ARCHIVE	1351950	483682	No
A1PI-ST2-SB	A1PI-ST2-SB-09M	TAL B	1351965	483719	No
A1PI-ST2-SB	A1PI-ST2-SB-09R	TAL A	1351965	483719	No
A1PI-ST2-SB	A1PI-ST2-SB-10M	TAL B	1352002	483720	No
A1PI-ST2-SB	A1PI-ST2-SB-10R	TAL A	1352002	483720	No
A1PI-ST2-SB	A1PI-ST2-SB-11M	TAL B	1352001	483750	No
A1PI-ST2-SB	A1PI-ST2-SB-11R	TAL A	1352001	483750	No
A1PI-ST2-SB	A1PI-ST2-SB-12MV	ARCHIVE	1352006	483775	No
A1PI-ST2-SB	A1PI-ST2-SB-12RV	ARCHIVE	1352006	483775	No
A1PI-ST2-SB	A1PI-ST2-SB-13M	TAL B	1351957	483783	No
A1PI-ST2-SB	A1PI-ST2-SB-13R	TAL A	1351957	483783	No
A1PI-ST2-SB	A1PI-ST2-SB-14M	TAL B	1351942	483812	No
A1PI-ST2-SB	A1PI-ST2-SB-14R	TAL A	1351942	483812	No
A1PI-ST2-SB	A1PI-ST2-SB-15M	TAL B	1351981	483830	No
A1PI-ST2-SB	A1PI-ST2-SB-15R	TAL A	1351981	483830	No
A1PI-ST2-SB	A1PI-ST2-SB-16MV	ARCHIVE	1351960	483885	No
A1PI-ST2-SB	A1PI-ST2-SB-16RV	ARCHIVE	1351960	483885	No
A1PI-ST3-BB	A1PI-ST3-BB-01M	TAL B	1351830	483282	No
A1PI-ST3-BB	A1PI-ST3-BB-01R	TAL A	1351830	483282	No
A1PI-ST3-BB	A1PI-ST3-BB-02M	TAL B	1351833	483305	No
A1PI-ST3-BB	A1PI-ST3-BB-02MD	TAL B	1351833	483305	No
A1PI-ST3-BB	A1PI-ST3-BB-02R	TAL A	1351833	483305	No
A1PI-ST3-BB	A1PI-ST3-BB-02RD	TAL A	1351833	483305	No
A1PI-ST3-BB	A1PI-ST3-BB-03M	TAL B	1351860	483298	No
A1PI-ST3-BB	A1PI-ST3-BB-03R	TAL A	1351860	483298	No
A1PI-ST3-BB	A1PI-ST3-BB-04MV	ARCHIVE	1351858	483328	No
A1PI-ST3-BB	A1PI-ST3-BB-04RV	ARCHIVE	1351858	483328	No
A1PI-ST3-BB	A1PI-ST3-BB-05M	TAL B	1351872	483346	No
A1PI-ST3-BB	A1PI-ST3-BB-05R	TAL A	1351872	483346	No
A1PI-ST3-BB	A1PI-ST3-BB-06M	TAL B	1351904	483368	No
A1PI-ST3-BB	A1PI-ST3-BB-06R	TAL A	1351904	483368	No
A1PI-ST3-BB	A1PI-ST3-BB-07M	TAL B	1351919	483395	No
A1PI-ST3-BB	A1PI-ST3-BB-07R	TAL A	1351919	483395	No
A1PI-ST3-BB	A1PI-ST3-BB-08MV	ARCHIVE	1351909	483410	No
A1PI-ST3-BB	A1PI-ST3-BB-08RV	ARCHIVE	1351909	483410	No
A1PI-ST3-BB	A1PI-ST3-BB-09M	TAL B	1351912	483428	No
A1PI-ST3-BB	A1PI-ST3-BB-09R	TAL A	1351912	483428	No
A1PI-ST3-BB	A1PI-ST3-BB-10M	TAL B	1351883	483419	No
A1PI-ST3-BB	A1PI-ST3-BB-10R	TAL A	1351883	483419	No
A1PI-ST3-BB	A1PI-ST3-BB-11M	TAL B	1351859	483459	No
A1PI-ST3-BB	A1PI-ST3-BB-11R	TAL A	1351859	483459	No

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APPENDIX B
A1PI SEDIMENT TRAPS 2 and 3 CERTIFICATION

Sample Identifiers, TALs, Locations, and Validation Information 1706

Certification Unit	Sample ID	TAL List	Easting	Northing	Validation?
A1PI-ST3-BB	A1PI-ST3-BB-12MV	ARCHIVE	1351932	483426	No
A1PI-ST3-BB	A1PI-ST3-BB-12RV	ARCHIVE	1351932	483426	No
A1PI-ST3-BB	A1PI-ST3-BB-13M	TAL B	1351810	483390	No
A1PI-ST3-BB	A1PI-ST3-BB-13R	TAL A	1351810	483390	No
A1PI-ST3-BB	A1PI-ST3-BB-14M	TAL B	1351793	483370	No
A1PI-ST3-BB	A1PI-ST3-BB-14R	TAL A	1351793	483370	No
A1PI-ST3-BB	A1PI-ST3-BB-15M	TAL B	1351781	483354	No
A1PI-ST3-BB	A1PI-ST3-BB-15R	TAL A	1351781	483354	No
A1PI-ST3-BB	A1PI-ST3-BB-16MV	ARCHIVE	1351782	483310	No
A1PI-ST3-BB	A1PI-ST3-BB-16RV	ARCHIVE	1351782	483310	No
A1PI-ST3-BM	A1PI-ST3-BM-01M	TAL B	1351830	483282	Yes
A1PI-ST3-BM	A1PI-ST3-BM-01R	TAL A	1351830	483282	Yes
A1PI-ST3-BM	A1PI-ST3-BM-02M	TAL B	1351833	483305	Yes
A1PI-ST3-BM	A1PI-ST3-BM-02MD	TAL B	1351833	483305	Yes
A1PI-ST3-BM	A1PI-ST3-BM-02R	TAL A	1351833	483305	Yes
A1PI-ST3-BM	A1PI-ST3-BM-02RD	TAL A	1351833	483305	Yes
A1PI-ST3-BM	A1PI-ST3-BM-03M	TAL B	1351860	483298	Yes
A1PI-ST3-BM	A1PI-ST3-BM-03R	TAL A	1351860	483298	Yes
A1PI-ST3-BM	A1PI-ST3-BM-04MV	ARCHIVE	1351858	483328	Yes
A1PI-ST3-BM	A1PI-ST3-BM-04RV	ARCHIVE	1351858	483328	Yes
A1PI-ST3-BM	A1PI-ST3-BM-05M	TAL B	1351872	483346	Yes
A1PI-ST3-BM	A1PI-ST3-BM-05R	TAL A	1351872	483346	Yes
A1PI-ST3-BM	A1PI-ST3-BM-06M	TAL B	1351904	483368	Yes
A1PI-ST3-BM	A1PI-ST3-BM-06R	TAL A	1351904	483368	Yes
A1PI-ST3-BM	A1PI-ST3-BM-07M	TAL B	1351919	483395	Yes
A1PI-ST3-BM	A1PI-ST3-BM-07R	TAL A	1351919	483395	Yes
A1PI-ST3-BM	A1PI-ST3-BM-08MV	ARCHIVE	1351909	483410	Yes
A1PI-ST3-BM	A1PI-ST3-BM-08RV	ARCHIVE	1351909	483410	Yes
A1PI-ST3-BM	A1PI-ST3-BM-09M	TAL B	1351912	483428	Yes
A1PI-ST3-BM	A1PI-ST3-BM-09R	TAL A	1351912	483428	Yes
A1PI-ST3-BM	A1PI-ST3-BM-10M	TAL B	1351883	483419	Yes
A1PI-ST3-BM	A1PI-ST3-BM-10R	TAL A	1351883	483419	Yes
A1PI-ST3-BM	A1PI-ST3-BM-11M	TAL B	1351859	483459	Yes
A1PI-ST3-BM	A1PI-ST3-BM-11R	TAL A	1351859	483459	Yes
A1PI-ST3-BM	A1PI-ST3-BM-12MV	ARCHIVE	1351932	483426	Yes
A1PI-ST3-BM	A1PI-ST3-BM-12RV	ARCHIVE	1351932	483426	Yes
A1PI-ST3-BM	A1PI-ST3-BM-13M	TAL B	1351810	483390	Yes
A1PI-ST3-BM	A1PI-ST3-BM-13R	TAL A	1351810	483390	Yes
A1PI-ST3-BM	A1PI-ST3-BM-14M	TAL B	1351793	483370	Yes
A1PI-ST3-BM	A1PI-ST3-BM-14R	TAL A	1351793	483370	Yes
A1PI-ST3-BM	A1PI-ST3-BM-15M	TAL B	1351781	483354	Yes
A1PI-ST3-BM	A1PI-ST3-BM-15R	TAL A	1351781	483354	Yes

APPENDIX B

A1PI SEDIMENT TRAPS 2 and 3 CERTIFICATION

Sample Identifiers, TALs, Locations, and Validation Information 1706

Certification Unit	Sample ID	TAL List	Easting	Northing	Validation?
A1PI-ST3-BM	A1PI-ST3-BM-16MV	ARCHIVE	1351782	483310	Yes
A1PI-ST3-BM	A1PI-ST3-BM-16RV	ARCHIVE	1351782	483310	Yes
A1PI-ST3-SB	A1PI-ST3-SB-01M	TAL B	1351811	483308	No
A1PI-ST3-SB	A1PI-ST3-SB-01MD	TAL B	1351811	483308	No
A1PI-ST3-SB	A1PI-ST3-SB-01R	TAL A	1351811	483308	No
A1PI-ST3-SB	A1PI-ST3-SB-01RD	TAL A	1351811	483308	No
A1PI-ST3-SB	A1PI-ST3-SB-02M	TAL B	1351832	483312	No
A1PI-ST3-SB	A1PI-ST3-SB-02R	TAL A	1351832	483312	No
A1PI-ST3-SB	A1PI-ST3-SB-03M	TAL B	1351796	483324	No
A1PI-ST3-SB	A1PI-ST3-SB-03R	TAL A	1351796	483324	No
A1PI-ST3-SB	A1PI-ST3-SB-04MV	ARCHIVE	1351827	483326	No
A1PI-ST3-SB	A1PI-ST3-SB-04RV	ARCHIVE	1351827	483326	No
A1PI-ST3-SB	A1PI-ST3-SB-05M	TAL B	1351851	483337	No
A1PI-ST3-SB	A1PI-ST3-SB-05R	TAL A	1351851	483337	No
A1PI-ST3-SB	A1PI-ST3-SB-06M	TAL B	1351801	483348	No
A1PI-ST3-SB	A1PI-ST3-SB-06R	TAL A	1351801	483348	No
A1PI-ST3-SB	A1PI-ST3-SB-07M	TAL B	1351827	483351	No
A1PI-ST3-SB	A1PI-ST3-SB-07R	TAL A	1351827	483351	No
A1PI-ST3-SB	A1PI-ST3-SB-08MV	ARCHIVE	1351847	483352	No
A1PI-ST3-SB	A1PI-ST3-SB-08RV	ARCHIVE	1351847	483352	No
A1PI-ST3-SB	A1PI-ST3-SB-09M	TAL B	1351823	483366	No
A1PI-ST3-SB	A1PI-ST3-SB-09R	TAL A	1351823	483366	No
A1PI-ST3-SB	A1PI-ST3-SB-10M	TAL B	1351860	483372	No
A1PI-ST3-SB	A1PI-ST3-SB-10R	TAL A	1351860	483372	No
A1PI-ST3-SB	A1PI-ST3-SB-11M	TAL B	1351840	483372	No
A1PI-ST3-SB	A1PI-ST3-SB-11R	TAL A	1351840	483372	No
A1PI-ST3-SB	A1PI-ST3-SB-12MV	ARCHIVE	1351834	483393	No
A1PI-ST3-SB	A1PI-ST3-SB-12RV	ARCHIVE	1351834	483393	No
A1PI-ST3-SB	A1PI-ST3-SB-13M	TAL B	1351859	483399	No
A1PI-ST3-SB	A1PI-ST3-SB-13R	TAL A	1351859	483399	No
A1PI-ST3-SB	A1PI-ST3-SB-14M	TAL B	1351886	483408	No
A1PI-ST3-SB	A1PI-ST3-SB-14R	TAL A	1351886	483408	No
A1PI-ST3-SB	A1PI-ST3-SB-15M	TAL B	1351863	483411	No
A1PI-ST3-SB	A1PI-ST3-SB-15R	TAL A	1351863	483411	No
A1PI-ST3-SB	A1PI-ST3-SB-16MV	ARCHIVE	1351854	483436	No
A1PI-ST3-SB	A1PI-ST3-SB-16RV	ARCHIVE	1351854	483436	No